DISTRIBUTION OF THE INTRODUCED PINE SAWFLY IN THE SOUTHERN APPALACHIANS

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Figure 1. Male introduced pine sawfly.

ABSTRACT

In 1977, an infestation of the introduced pine sawfly was discovered at Crossnore, N.C. The insect was new to the southern Appalachians and its distribution unknown. With the use of a pheromone extract from virgin female sawflies, a survey was begun in 1979 to locate the infestation's leading edge and determine its rate of spread. The results of the 1981 survey are presented here.

INTRODUCTION

The introduced pine sawfly, Diprion similis (Hartig), was introduced into New England in the early 1900's. It has since become established across the northern tier states to Wisconsin and across southern Canada. In 1977, an infestation was detected for the first time in the southern Appalachians.

Since the sawfly is relatively new to this geographic region, its distribution has not stabilized, and the extent of its occurrence will undoubtedly change between years or even between generations. To adequately implement pest management strategies, a reliable and rapid survey method was used to determine the extent and severity of the infestation. The powerful effect of the sex pheromone released by virgin females for attracting male sawflies has long been known (Coppel et al., 1960). Procedures developed by Wisconsin workers indicate that active material obtained in the laboratory from virgin females was effective for trapping purposes (Casida et al., 1963; Jones et al, 1965; Jewett et al., 1978).

In 1979, a pheromone extract from virgin female sawflies was operationally used as a survey tool to determine the extent of the sawfly infestation along the Blue Ridge Parkway (Ghent and Thomas, 1979). Based on the success of that survey, a cooperative effort among Forest Pest Management and the Divisions of Forestry of North Carolina, Tennessee, and Virginia was conducted to delineate the full extent of the outbreak in the southern Appalachians for 1980 (Ghent and Mitchell, 1980). The cooperative survey was again conducted for the larger southern infestation in 1981.

METHODS

During the winter of 1980, several thousand prepupal cocoons were collected and reared out to obtain virgin females. Females were frozen upon emergence. When the desired number of sawflies was acquired, the pheromone was extracted by the Southeastern Forest Experiment Station, at Research Triangle Park, according to a method described by Jewett (1978).

The amount of pheromone placed in dental wicks for use as a lure is expressed as a fraction of the material obtained from the total number of sawflies used for the extraction. A sawfly equivalent or "SFE" is defined as that fraction representing a single female (Casida et al., 1963). Each dental wick contained 10 SFE.

Wicks were placed in the center of Pherocon® II traps (Zoecon Corp., Palo Alto, Calif.). Since the leading edge of the infestation had been delineated in 1980, only areas outside were surveyed this year. During peak sawfly emergence in May and June of 1980, the traps were placed at predetermined locations. After two weeks, the traps were examined and the number of male sawflies caught was recorded. Those trap locations with positive (at least one male trapped) results closest to a negative (no males trapped) trap were moved at 5-mile increments toward the negative location and checked periodically. If the trap was again positive, it was moved again until a negative trap was recorded. In this manner, the edge of the infestation was plotted. Due to a limited supply of pheromone, only the southern infestation was surveyed. ?

Figure 2 shows the southern area infested in 1980 and the area infested in 1981.

RESULTS

In 1980, the southern infestation covered 15,500 sq. km. (approximately 6,000 sq. mi.); currently the sawfly infests approximately 24,000 sq. km. (approximately 10,000 sq. mi.). The major increase occurred in a southwest to northeast direction. This is probably due to the distribution and concentration of native white pine occur in that direction. In areas east and west of the infestation, white pine nears the edge of its range.

The rapid growth of the infestation was surprising. However, since the pheromone attracts males from only a limited distance, areas with very low populations may not have been detected. Therefore, areas which were negative last year may, in fact, have been infested; and, likewise, areas undetected this year are likely to exist and will be located as sawfly populations build to some detectable level. It is likely that eventually the entire native range of eastern white pine will become infested.

Another survey is planned for 1982.

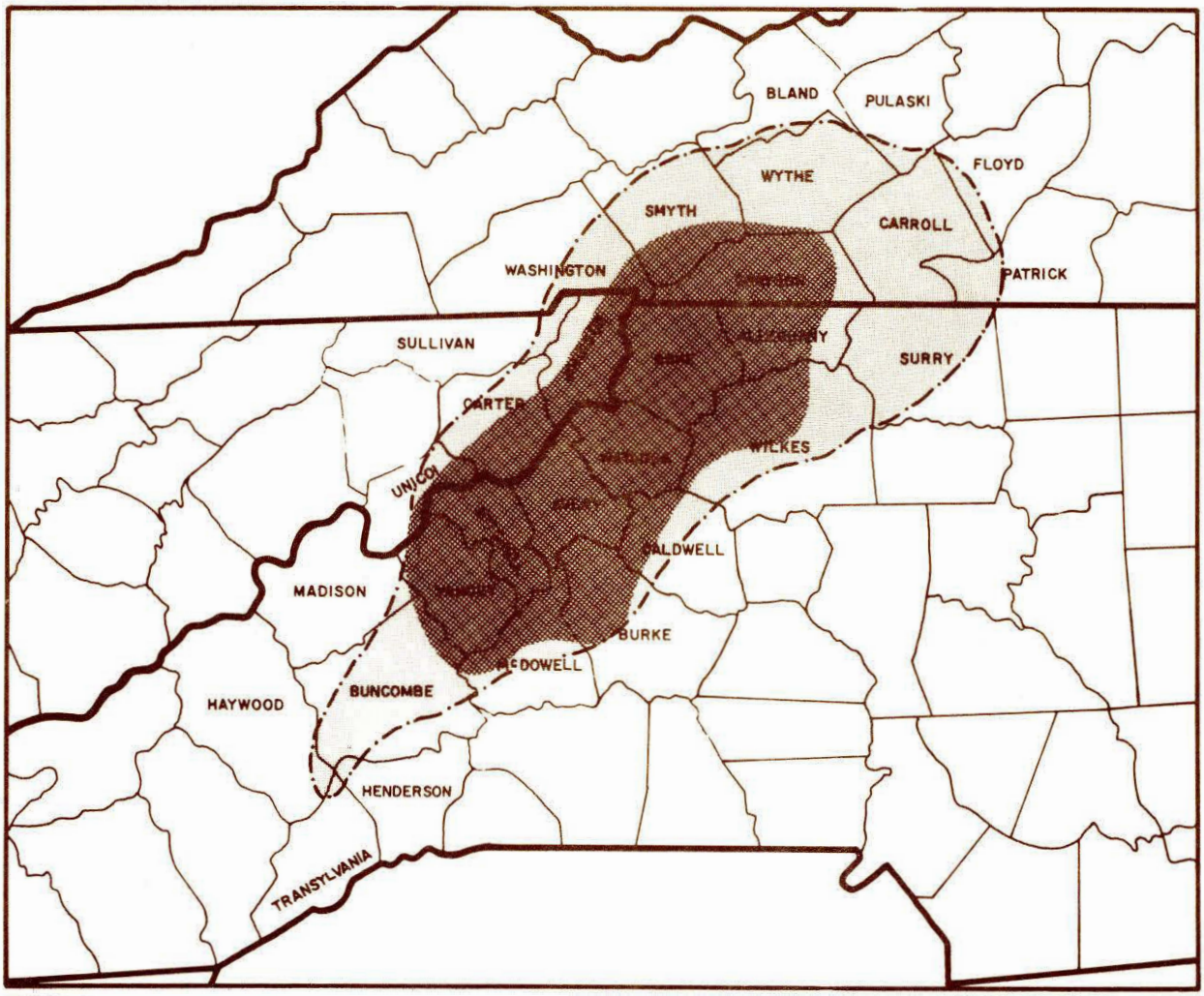

Figure 2. Distribution of the introduced pine sawfly for 1980 and 1981.

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